TECHNICAL MEMORANDUMS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

No. 240

RULES AND REGULATIONS FOR ENDURANCE CONTEST OF AVIATION ENGINES.

(Under the Auspices of the Aero Club of France.)

From "Concours de Moteurs de Grande Endurance pour L'Aéronautique."

November, 1923.

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

TECHNICAL MEMORANDUM NO. 240.

RULES AND REGULATIONS FOR ENDURANCE CONTEST OF AVIATION ENGINES.*

(Under the auspices of the Aero Club of France.)

CHAPTER I. - GENERAL DISPOSITIONS

Art. 1. - Financing of Contest.- On the initiative of the "Comité francais de propagande aéronautique" (French Committee for the Promotion of Aeronautics) a grand endurance contest of aviation engines has been instituted, for which the Under Secretary of State for Aeronautics and the French Committee for the Promotion of Aeronautics have each appropriated 1,000,000 French francs.

This contest, half French and half international, is governed by these "Rules and Regulations" established in collaboration by the "Service technique de l'Aéronautique" and by the "Commission d'Aviation de l'Aero-Club de France."

Art. 2. - Allotment of the Two Million Francs.- a) The million francs appropriated by the Under Secretary of State for Aeronautics is to be used for defraying the expense of testing French engines, in accordance with Art. 26, and for two prizes of 300,000 francs each, reserved for French engines under the conditions established in Art. 28.

* From Concours de Moteurs de Grande Endurance pour l'Aéronautique, October 5, 1923.

The term "French engine" means an engine whose principal parts have been designed, manufactured and assembled in France by a French constructor or company. It must also be entered by a French contestant.

b) The million francs appropriated by the "Comité francais de propagande aéronautique" is to be used by said committee for purchasing (including all government taxes) the engine, French or foreign, which shall be awarded first place in the general classification. The engine shall be reconveyed by the committee to the French Government for the sum of one franc.

Art. 3.-- Entrants.- The entry shall be made by the person or society competent to cede the right to manufacture the engine, while guaranteeing the French Government against all claims of outside parties.

Participation in the contest is denied to all parties belonging to any country having engaged in war against France during the period 1914-1918, as likewise to all engines designed or built in such country, unless admitted to the "Society of Nations" before March 1, 1922.

The same contestant shall not enter two or more engines which are identical or differ only in parts considered accessories by the jury. It is allowable, however, for him to enter two or more different engines.

Art. 4. - Entries.- Entries, one for each engine, must reach the "Commission d'Aviation de l'Aéro-Club de France" before Decem-

ber 1, 1922.

Each entry shall be accompanied by a fee of 20,000 francs and, for each foreign engine, by a contribution of 10,000 francs toward defraying the cost of the tests.

"Double-fee" entries shall be received up to December, 1923, the special contribution of foreign contestants, for defraying the cost of the tests, remaining fixed at 10,000 francs.

One-half of the entry fee proper, i.e. 10,000 francs or 20,000 francs, as the case may be, will be refunded for each engine which passes the elimination tests (Chapter II).

The special contribution of 10,000 francs, by foreign contestants, will be refunded to those who withdraw before March 1, 1924, the opening date of the contest.

By the simple fact of his entry, the contestant acknowledges as binding and without appeal every decision made by the jury in conformity with Art. 7.

Art. 5. - Special Stipulations regarding Foreign Contestants.- The entry of a foreign contestant must also be accompanied by a written declaration specifying that, if his engine should be awarded the first place, he will deliver it, in running order, to the "Comité francais de propagande aéronautique" for the payment, at the expiration of the periods indicated below, of the sum specified in paragraph b of Art. 2, that is to say, one million francs, less government taxes.

The delivery of the engine shall include scale plans of the

assembly and of details, as also a list of the parts, with indication of the nature, composition and thermal treatment of the metal.

The declaration shall also specify that the French Government or French companies approved by it shall have the right, within six months following the publication of the award, to purchase, for France, its colonies and protectorates, the exclusive right to build the engine awarded the highest honors, in consideration of certain royalties to be paid the successful contestant, the maximums of which shall be as follows:

8000 francs per engine for the first 100 engines,
7000 " " " " " second " "
6000 " " " " " third " "

and so on, with a diminution of 1000 francs per engine for each succeeding hundred up to the 601st engine, beginning with which the royalty shall be 2000 francs per engine.

However, if at the expiration of two years from the signing of the contract, all the purchasers of the privilege together have not paid royalties on at least 200 engines, the winning contestant shall have the right to cancel the contract.

The purchasers shall have the right, without any supplementary contract, to make repairs, for both public and private parties, in France, its colonies and protectorates.

Foreign contestants shall not consent, for the profit of a third party, to any sale capable of impairing the conditions specified in this article, which conditions must be imposed on the purchaser for the above purposes.

The payment to be made by the "Comité francais de propagande aéronautique" can be demanded only after the completion of the sale of the privilege, if it is purchased by the French Government or societies approved by it.

Art. 6. - Presentation of the Engines.- Each engine shall be delivered in running order before March 1, 1924, at such place as shall be designated later by the S.T.Aé.("Service Technique de l'Aéronautique Francaise"), in charge of the tests.

The engines shall be delivered in boxes which shall be sealed at the time of shipment in the presence of the constructor or his representative. They shall not be removed from their boxes until they are to be mounted on the bench for the qualifying test. They must therefore be sufficiently oiled to require no attention in the meantime.

They shall be insured against fire at the trouble and expense of the contestants, the Government assuming no responsibility in this matter.

Art. 7. - Jury.- A jury, composed of ten members, half of whom are appointed by the Under Secretary of State for Aeronautics and half jointly by the French Committee for the Promotion of Aeronautics and the Aviation Committee of the Aero Club of France, shall witness all the tests and shall render their decision (which is final) on all questions. This jury shall make and announce the awards.

The decisions of the jury are valid only when at least five

members have voted, the issue to be determined by the majority of those voting.

In case of the decease, resignation, or prolonged absence of a juror, he shall be replaced, in the order of inscription in the same category, from a list of ten substitutes appointed half by the Under Secretary of State for Aeronautics and half jointly by the French Committee for the Promotion of Aeronautics and the Aviation Committee of the Aero-Club of France.

CHAPTER II. - CONDITIONS OF ADMISSION AND ELIMINATION TESTS.

Art. 8. - Technical Conditions.- In order to be admitted to the contest, the engine must satisfy the following general conditions:

1. They shall be internal combustion engines;

2. Their nominal power π, shall be between 350 and 450 HP;

3. For this power, their weight per HP shall not exceed 3.3 kg, this weight to comprise the weight of the engine stripped + fuel and oil (not including tanks) for five hours' running;

4. The R.P.M. of the propeller shall not exceed $\frac{32000}{\sqrt{\pi}}$

5. A starter, forming a constituent part of the engine, shall make it possible to start without turning the propeller by hand or crank and shall be used for all starts.

By "nominal power" is meant the power which the engine is capable of furnishing for half an hour on the ground at N R.P.M.

The weight of the engine stripped, in running order, shall be determined by the weight of the engine at the end of the qualifying test prescribed in Art. 10. This weight shall comprise the weight of the engine proper without fuel, but with the lubricating oil inside the engine at the end of this test, together with the water in the cylinder jackets, the pump and the pipes between the pump and the cylinders. It shall also comprise such accessories as are necessary for its functioning, namely:

Carburetor, air and gas intake pipes, controls of heating device, fuel drain-cock;

Magnetos, storage batteries with control, wires and spark-plugs;

Oil pump and piping;

Water pump;

Drain cocks;

Fuel feed with its control (It shall be made sure that it is possible to elevate the fuel at least three meters above the constant level of the carburetor);

Revolution-indicator;

Scavenging pump for two-stroke engines;

Fan for cooling air-cooled engines, if the engine tested has one in the test on an airplane;

Reduction gear complete with transmission, if the propeller is not attached directly to the crankshaft;

Propeller hub with bolts;

Starter, not including weight of fuel tanks or storage batteries;

And, in general, the weight of any device essential to the functioning of the engine.

Art. 9. - Elimination Tests.- These tests consist of a qualifying test and running the engine on an airplane furnished by the contestant, who will have to install his engine on said airplane and provide the pilot.

Each of these tests may be recommenced three times.

Art. 10. - Qualifying Test.- This shall be a five-hour bench test with the "club" to be used in the endurance test. The number of revolutions (N), corresponding to the nominal HP fixed by the contestant, shall be determined. If the value of N, thus obtained, is above the stipulated limit, the value π, corresponding to this limit shall be taken for the nominal power, provided it comes within the 350-450 limits stipulated in Art. 8. If these conditions are not fulfilled, the contestant must modify the "club" correspondingly. The curve of utilization shall then be plotted against the R.P.M. while varying the fuel intake.

After this has been done, it shall be determined:

a) Whether the engine picks up without misfires or backfires and whether, in working the throttle for all the engine speeds between the R.P.M. when the throttle is wide open and one-third of this number, there is any position of the throttle at which the engine stalls or at which the change in the R.P.M. of the en-

gine takes place in the opposite direction to that corresponding to the motion of the throttle. The time required for passing from the slowest speed to that with the throttle wide open must not exceed two seconds;

b) Whether the engine can run 15 minutes at an R.P.M. not exceeding one-third of the R.P.M. with the throttle wide open. Immediately after this test, it shall be determined as to whether the engine can pick up as above stipulated;

c) Whether the engine can run half an hour at a longitudinal inclination of 15° and also for half an hour with an inclination of 15° in the opposite direction.

Art. 11. - Flight Test.- The object of this test is simply to determine the possibility of adapting the engine to the propulsion of an airplane. It shall consist of a two-hours flight with a single-engine airplane. The choice of the airplane and pilot, as also the installation of the engine on the airplane, shall be made by the contestant.

The altitude of 2000 meters, as indicated by the barograph, must be maintained for at least an hour without interruption.

The propeller employed in the flight test shall have such a diameter that, for the R.P.M. (N), already defined, the peripheral velocity shall be at least 250 m/sec. The mean R.P.M., determined by a recording tachometer, inspected by the "Service Technique Aéronautique," shall be at least equal to 0.9 N for an hour, without interruption.

It shall also be determined as to whether this propeller, mounted on the engine, brakes it constantly at an R.P.M. not exceeding N for the throttle opening which gives N revolutions per minute with the club.

CHAPTER III. - ENDURANCE TEST.

Art. 12. - Endurance Test.- This test shall determine the award.

It shall consist of a functioning on the bench for at least 240 hours in periods of 8 hours. Only the engines which complete this test shall be considered in making the awards.

The tests shall take place in still air for fixed water-cooled engines and in an air current not exceeding 200 km per hour for air-cooled engines.

Before beginning this test, the contestant may lay in a supply of spare parts for possible repairs, which shall be completed within 30 days, not counting holidays, under penalty of annulment of the endurance test, as provided in Art. 16.

Any delay in executing the endurance test shall not exceed 100 days, not counting holidays, it being understood that any delay imputable to the management shall not be counted. If this period is exceeded, the test shall be annulled. (It is specified that, in each 24-hour day, the working period shall not exceed 11 hours, beginning at 7 a.m.)

The contestant shall have access to his engine one hour before the time set for the beginning of the test, at which moment

it must be running at its nominal power.

Art. 13. - Eight-hour Tests.- The nominal power shall be maintained half an hour at N R.P.M., as determined in the qualification test. During the following 7.5 hours, the fuel intake shall be regulated in such manner as to keep the engine at the power at which the contestant thinks it can best satisfy the conditions of the test.

The mean of the powers thus obtained for 7.5 hours shall be reduced to the power in the air at 15°C and 760 mm Hg, by assuming that the power increases proportionally to the ratio 515 : 500 + t, t being the temperature in degrees centigrade. This corrected mean shall be considered the normal power of the engine during the test and must be equal to at least 0.9 of the nominal power. If this condition is not fulfilled, the nominal power obtained by multiplying the normal power realized by 10/9 shall constitute the corrected value of the nominal power for the eight-hour test under consideration.

During the test at normal power, the R.P.M., as soon as it exceeds the value N as shown by the tachometer and by a recording revolution-counter, will be immediately restored to the stipulated number.

The contestant shall have access to his engine for an hour after each eight-hour test.

Art. 14. - Penalization Points in the Eight-Hour Tests.- In each eight-hour test, penalization points shall be imposed as

follows:

1. Delay in beginning the test shall entail a penalty of 4 points for a delay of less than 15 minutes and of 8 points for a delay of 15 to 60 minutes. If the delay is more than an hour, the test shall be annulled.

2. Any stop during a test shall entail a penalty of 10 points and an additional penalty shall be applied, according to the duration of the stop, as follows: less than 15 minutes, 4 points; from 15 to 60 minutes, 8 points. If the duration of the stop exceeds one hour, the eight-hour test shall be annulled.

3. Replacements or reparations of parts shall be penalized as follows:

a) Spark-plug, 4 points;

b) Each separate part or assembly which is replaced or repaired within an hour, if such that the engine can immediately continue the series of eight-hour tests, without new adjustment or preliminary test, 10 points.

c) Every separate part or assembly, for changing or repairing which more than an hour is required and such that the engine can immediately continue the eight-hour tests, without new adjustment or preliminary test, 20 points.

d) Every separate piece or assembly such that the engine can continue the series of eight-hour tests only after new adjustment or a preliminary test, 50 points.

e) Magneto, carburetor, ignition commutator, starter, fuel pump, water pump, 75 points.

f) Every assembly, such as the oil pump, complete cylinder or group of cylinders, connecting-rod with bushings, reduction gear, camshaft, crankshaft, crankcase, scavenging air-pump, cooling-fan if the engine had one on the airplane during the elimination test, 100 points.

These penalties apply also to exchanges and repairs of parts made during the hour preceding and the hour following the eight-hour test.

4) For any part previously replaced, the new penalty is found by multiplying the one given in section 3 by the number of times it has been replaced or repaired, or replaced by parts answering the same purpose, spark-plugs and valves excepted. The penalty shall be 4 points for a spark-plug and either 10 or 20 for a valve, according to whether it belongs to the list of parts in b or c. This penalty shall be increased by a number of points equal to the number of spark-plugs or valves previously exchanged.

The damaged part or assembly may be replaced by a part or assembly not identical, but interchangeable. Account shall be taken of any resulting increase in weight which would affect the original value of the weight per HP and this new value shall apply to all tests previously made. If the replacement entails a lightening, no change shall be made in the original weight.

5. Each eight-hour test annulled shall entail a penalty of 100 points, in addition to the other penalties.

6. Lastly, each day of delay, after the 30 days (not counting holidays) accorded for the 30 eight-hour tests of the endurance test, shall entail a penalty of 50 points.

Art. 15. - Annulment of an Eight-hour Test.- An eight-hour test shall be annulled:

1. If the test is not begun within an hour after the time appointed;

2. If there is any penalizable stop, of whatever length, during the first hours of the test;

3. If there is any penalizable stop of over one hour;

4. If there are two penalizable stops;

5. If the normal power realized, including corrections, gives a nominal power corresponding to an eliminatory weight per HP.

Art. 16. - Annulment of Endurance Test.- This test shall be annulled in the following cases:

1. After the annulment of 10 eight-hour tests;

2. If it should be necessary to replace any of the assemblies, mentioned in paragraph f, section 3 of Art. 14, a number of times equal to half the number of corresponding assemblies comprised in the engine in running order, excepting that, when an engine has only one assembly of the kind, it may be replaced once without entailing annulment;

3. When the interval between two eight-hour tests exceeds 30 days, not counting holidays;

4. If the duration of the endurance test, including all stops (not counting holidays) exceeds 100 days, it being understood that the duration of daily work shall not exceed 11 hours, beginning at 7 a.m.

Any engine whose endurance test has been annulled, either by reason of one of these conditions or on the written request of the contestant, shall have the right to recommence once with a penalization of 500 points in place of the penalties incurred during the first test.

The annulment conditions of this second test shall be the same as for the first, excepting its duration, which shall not exceed 80 days, instead of 100.

The contestant shall have the right to replace the parts, which caused the troubles penalized, or those having the same function, by any other interchangeable parts, whether identical or not. If such changes cause a lightening in weight, the former value shall be conserved, but if they cause an increase in weight, the new value shall be used.

Art. 17. - Exclusion from the Contest.- Any engine shall be excluded from the contest:

1. If the contestant renounces the second endurance test or if he does not succeed in it;

2. If the contestant is not ready to begin the second endurance test within 30 days, not counting holidays, after the date of annulment of the first endurance test;

3. If any attempt to bribe is discovered, in which event all other engines entered by the same contestant shall likewise be excluded.

Art. 18. - Economic Efficiency.- In order to evaluate this efficiency, the nominal HP shall be determined from the mean of the corrected nominal horsepowers of the 30 eight-hour tests.

In order to take the propeller efficiency into account, this nominal power shall be multiplied by the factor $\left(\frac{32000}{N\sqrt{\pi}}\right)0.1$. The number thus obtained shall be added to that resulting from the fuel and oil consumption per HP/hour for five hours. The total shall serve to determine the weight per HP, this weight comprising the elements enumerated in section 3 of Art. 8.

Below the weight of 3 kg per HP, there shall be awarded a bonus of 5 points per gram.

Above the weight of 3 kg per HP, there shall be imposed a penalty of 5 points per gram.

The employment of a fuel with a flashing-point above 35°C shall yield a bonus equivalent to 200 grams per HP, or 1000 points.

Art. 19. - Penalization for Head Resistance or Drag.- The area shall be determined, in square decimeters, of the surface contained inside the smallest convex contour surrounding the orthogonal projection of the stripped engine on a plane perpendicular to the propeller axis. The number thus found, multiplied by $400/\pi$, shall determine the amount of the penalty.

CHAPTER IV. - CONDITIONS UNDER WHICH TESTS ARE TO BE MADE.

Art. 20. - Mounting of Engines.- The installation of the engine on the bench is in charge of the contestant, who shall furnish all parts or accessories not present in the laboratory and essential for the functioning of his engine. He shall furnish the "club" required for the endurance test and the necessary parts for mounting the "club" on the engine.

For water-cooled engines, if the laboratory does not provide a closed circulation to prevent scaling; the contestant may use any scale-remover he may choose.

Any leakage of water in the form of a continuous stream, however small, at any joint or part of the engine, as defined in Art. 8, shall entail the immediate stopping and repair of the engine, with corresponding penalties. In particular, if the leakage is due to any defect in the water jackets, the defective cylinders shall be repaired or replaced and the corresponding penalties shall be imposed.

The contestants may employ any device for cleaning the spark-plugs by means of disruptive sparks, while the engine is running. In this case, the weight of the device used shall be included in the weight of the stripped engine, as defined in Art. 8.

Art. 21. - Marking.- When an engine is mounted on the bench for the qualifying test, its principal outside parts shall be stamped or engraved so as to enable the identification of the en-

gine during the different tests.

In the event that one of the marked parts should need to be replaced, as the result of damages sustained in a preliminary test, such replacement shall be made on the spot, after notifying the inspection department and in the presence of one of its representatives. The exchange shall be limited to the damaged part.

The new part shall be stamped or engraved.

Art. 22. - Regulation of Tests. Insurance.- The bench tests shall be made in a government laboratory. Their execution shall be subject to the available material and personnel of their laboratory. The measuring and regulating instruments shall be furnished by the government.

The engines shall be tested in the order of their delivery to the "S.T.Ae." in charge of the tests. The functioning of each engine shall be attended to, however, by the contestant and his helpers, in conformity with the rules and regulations. All the operations of mounting and manipulation shall be performed by the contestant's personnel and on his responsibility.

The contestant shall be responsible for all accidents to the personnel and materiel caused by his engine or the parts operated by it. He shall contract all insurance needed for this purpose. He shall also insure his personnel against accidents, in conformity with the French laws in force during the contest.

The offer of any remuneration whatever to any of the laboratory personnel by any contestant or any of his agents shall be

considered as an attempt to bribe.

Any interruption of a test due to the agents of the government or to injuries to the measuring instruments shall be offset and shall not be penalized. During such interruption the engine shall not be subjected to any dismantling or inspection.

All dismantlings, reparations and inspections shall be made on the spot, under the supervision of the jury.

In any event, save that of abandoning the contest, the engine shall not be put at the free disposal of the contestant.

Neither the French Government nor its agents can be made the objects of suits for damages.

Art. 23. - Execution and Regulation of the Measurements.- All the bench tests shall be executed on an oscillating bench with a "club" of the usual shape, paddles, either fixed or movable, being prohibited.

The "club" shall have a polar moment of inertia, with respect to the axis of rotation, at least equal to 80% of the polar moment of inertia of the propeller used in the flight test. Its pitch shall be such as to produce no appreciable air current parallel to the axis of rotation. Exception is made of air-cooled engines, on which the club may be utilized for producing an axial current of air, provided its velocity does not exceed 200 km per hour, as stipulated in Art. 12. The contestant may, however, employ any device, approved by the jury, for preventing the air current from affecting the bench tests.

Each contestant shall furnish at least two identical clubs. He shall replace any club functioning in a manner deemed abnormal or dangerous by himself or by the inspection department. Such replacements shall not be penalized.

The same rules apply to every device which the contestant may use with his engine to assure its functioning on the bench.

The R.P.M. shall be regulated by means of two instruments: a tachometer with instantaneous indications and one giving the total number of revolutions. Both tachometers shall be applied to the same point of the engine.

Art. 24. - Measuring Fuel and Oil Consumption.- The total weight of fuel consumed shall be measured for each officially approved eight-hour test. For this purpose, the fuel tank is filled at the beginning of the test and the fuel added during the test is weighed, including whatever is required to fill the tank at the close of the test. This weight shall serve for calculating the mean fuel consumption of the engine and also for the possible refunding of the cost of the fuel. The calculation of the mean fuel consumption of the engine per HP/hour shall be made by adding the consumptions of all the approved eight-hour tests and combining them in a fictitious power equal to $\frac{\pi + 15\,\pi'}{16}$, an expression in which π is the mean nominal power and π' the mean normal power during the 30 tests. The consumption per HP thus obtained, multiplied by 5 (number of hours' supply stipulated in Art. 8) enters into the calculation of the weight per

HP for the economic efficiency stipulated in Art. 18.

The rules for calculating the oil consumption are the same as for the fuel, save that the oil consumed before the beginning of each eight-hour test shall enter into the calculation of the mean oil consumption. In the calculation of the total oil consumption, the difference in the weight of the oil in the engine at the beginning and at the end of the 240-hour test shall be disregarded.

Art. 25. - Quality of the Fuel and Oil.- Each contestant shall provide fuel and oil enough for all the tests.

The fuel shall conform to the stipulations then in force in the S.T.Aé.

For any fuel other than gasoline the contestant shall demonstrate:

1. That its flashing point, determined by the Luchair method, is above 35°C;

2. That it is on the market and can be purchased by the public.

The lubricants employed must answer the conditions imposed by the regulations then in force in the S.T.Aé.

The contestants shall report, before the beginning of the test, the source of fuel and oil they expect to use.

The jury reserves all rights and means of verification, as well from the dealer and contestant as on the test bench.

Any conviction of fraud shall entail exclusion from the contest.

Art. 26. - Reimbursement for Fuel and Oil.- For each French engine enrolled, the contestant shall be reimbursed for the fuel and oil consumed, during the first endurance test alone, in the determination of the consumption under the conditions indicated in Art. 24. This reimbursement shall be made during the day following the completion of the test.

The contribution of 10,000 francs, for each foreign engine, shall not be refunded.

CHAPTER V. - CLASSIFICATION, GENERAL AND NATIONAL.

Art. 27. - General Classification.- The general classification, common to both French and foreign engines, shall be made in accordance with the algebraic total of the points of penalization and bonification.

In case of a tie, the engines shall be classified by giving priority successively to the following results:

1. Success in the first endurance test;

2. Minimum number of penalization points in the successful endurance test;

3. Minimum number of eight-hour tests annulled during the course of the successful endurance test;

4. Minimum number of days consumed in this test, not including holidays or the time counted out by the management.

If no engine passes the first or second endurance test, the "Comité francais de propagande aéronautique" shall not purchase any engine.

Art. 28. - National Classification.- The French engines shall, moreover, be the object of two classifications, in which those obtaining the same number of points shall be classed "ex-aequo" (according to merit).

The first classification shall be made according to the algebraic sum of the points of penalization and bonification. One of the 300,000-franc prizes shall be awarded to the engine ranking first, or divided between the engines ranking first "ex-aequo". If no engine successfully passes the test, no prize shall be awarded.

The second classification shall be made according to the number of points relating to the combination of the economic efficiency and the drag. The other 300,000-franc prize shall be awarded to the engine ranking first or divided according to merit between the engines ranking first "ex-aequo". If no engine passes the test, no prize shall be awarded.

Both these prizes, as also the million from the "Comité francais", can go to the same engine.

Paris, April 1, 1922.

Engineer-in-Chief, Director of the S.T.Aé., Fortant.

President of the Aviation Committee of the Aero-Club of France, R. Soreau.

President of the French Committee for the Promotion of Aeronautics, General Duval.

Approved by the Secretary of State for Aeronautics and Aerial Transportation,

(Signed) Laurent Eynac.

(A)

Rules and Regulations for Endurance Contest

of Aviation Engines.

ENTRY APPLICATION.

I, _____ (name of applicant), residing at _____, wish to enter an engine of ___ HP _____(description of engine) _____ for the Endurance Contest of Aviation Engines in the category of {French / foreign} engines.

For this purpose and in conformity to the Rules and Regulations, I enclose the sum of _____ francs*, entry fee, and the sum of ten thousand francs, the special contribution by foreign contestants toward defraying the expenses of the test.**

I am acquainted with the Rules and Regulations for the Endurance Contest of Aviation Engines and accept them in their entirety.

I promise to conform in every way to all the stipulations of said Rules and Regulations.

I promise to take out insurance policies (accident and fire), as stipulated in said Rules and Regulations.

I promise to abide by all the decisions of the Contest Jury.

I expressly renounce any legal action against the organizers of the contest, the members of the jury, their representatives and agents, for whatever cause, and especially in the matter of

---

* Make checks and money orders payable to the Treasurer of the Aero-Club of France, without designation of treasurer's name.

** The latter sum applies only to foreign contestants.

accidents, injuries or any damages to my engine, myself, my representative or any one in my employ, either in the bench tests or in the flight tests.

I expressly declare them released from all responsibility, of whatever nature, as regards accidents, injuries or damages during the demonstrations and tests of the contest.

I accept the stipulation in Art. 5 of the Rules and Regulations for the event of my engine's being ranked first in the general classification.*

Made at _____ (Date)_____

Read and approved.

(Signature)

---

* This article applies only to foreign contestants.

(a)

COMMUNICATION

accompanying "Rules and Regulations for Endurance Contest of Aviation Engines."

Paris, October 5, 1923.

Please insert:

We have already had occasion to announce that an endurance contest for aviation engines is now open. The following "simple-fee" entries have been made:

2 engines, Renault;
1 engine, Salmson;
2 engines, Breguet;
2 engines, Lorraine Dietrich;
1 engine, Peugeot;
1 engine, Panhard & Levasseur.

"Double-fee" entries will be received up to December 1, 1923, at the "Commission d'aviation de l'Aero-Club de France," 35 rue Francois I, Paris.

The entry fee is 40,000 francs per engine. For each foreign engine, a contribution of 10,000 francs must also be made toward defraying the expenses of the tests. Of the above fee 20,000 francs will be refunded for each engine which satisfactorily passes the elimination tests.